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The colour of some green insects is not altered either by muriatic acid or carbonate of soda, and therefore appears to be a peculiar principle differing from that of vegetables.

Account of Experiments made on the Strength of Materials. By George Rennie, jun. Esq. In a Letter to Thomas Young, M.D. For. Sec. R.S. Read February 12, 1818. [*Phil. Trans.* 1818, p. 118.]

After taking a cursory view of the labours of others in this department of mechanical inquiry, Mr. Rennie proceeds to give an account of the apparatus which he employed, and of the result of his own experiments. Of the resistances opposed to the simple strains which may disturb the quiescent state of a body, the principal are: the repulsive force, whereby it resists compression; and the force of cohesion, whereby it resists extension. On the former, with few exceptions, there is scarcely anything on record. Lagrange, in his Memoir on the Force of Springs, published in 1760, represents the moment of elasticity by a constant quantity, without indicating the relation of this value to the size of the spring: but in the Memoir of 1770, on the Forms of Columns, when he considers a body whose dimensions and thickness are variable, he makes the moment of elasticity proportional to the fourth power of the radius:—but all these calculations, says Mr. Rennie, are inapplicable to columns under common circumstances. The results of experiments are also extremely discordant; for it is deduced from those of Reynolds, that the power required to crush a cubic quarter of an inch of cast iron is 200 tons, whereas in the author's experiments upon cubes of the same size, the amount never exceeded five tons; and although Mr. Reynolds probably employed metal cast at the furnace of Maidley Wood, which is very strong, yet this circumstance can have been but of little importance compared with the great disproportion of results.

Mr. Rennie employed four kinds of iron: the first taken from the centre of a large block, similar in appearance to what is usually called gun metal; the second from a small casting, close-grained, and of a dull gray colour; the third, horizontally cast iron, in bars three eighths of an inch square and eight inches long; the fourth, similar bars cast vertically. It appears from the annexed tables that the vertical castings are stronger than those taken from the block.

Some miscellaneous experiments relating to the different kinds of wood and stone are also added to those on the metals. They show that little dependence can be placed on the specific gravity of the stone; neither is hardness to be regarded as a characteristic of strength. In the rupture of amorphous stones, Mr. Rennie remarks, that pyramids are formed, having for their base the upper side of the cube next the lever, the action of which displaces the sides of the cubes precisely as if a wedge had operated between them.